

Amdt. dated May 28, 2004
Reply to Office action of 5/12/2004

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Previously presented) A method for maintaining workflow related information, comprising:

providing at least one table in a database storing workflow related data;

providing a plurality of programming interfaces, wherein each programming interface specifies an operation to perform on the workflow related data in the at least one table, wherein each programming interface is associated with one stored procedure call;

providing in the database one stored procedure for each stored procedure call and corresponding method, wherein the one stored procedure includes a plurality of database statements to perform the programming interface operation; and

executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

2. (Original) The method of claim 1, wherein one provided table comprises a workflow file table including entries of workflow files, wherein each workflow file includes code defining an entire workflow, including nodes and workflow parameters.

3. (Original) The method of claim 2, further comprising:

providing one table including information on actions associated with one workflow file in the workflow file table, wherein the associated actions are capable of being performed at the nodes defined in the associated workflow file.

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4. (Currently amended) A method for maintaining workflow related information, comprising: The method of claim 1, wherein there are

providing a plurality of tables including workflow related data; and wherein providing the plurality of programming interfaces and associated stored procedure calls and stored procedures further comprises:

providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface is associated with one stored procedure call; and

providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement the programming interface operations in the set, wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

5. (Original) The method of claim 4, wherein the programming interfaces for each table are members of a table class, wherein there is one table class for each table including workflow related data.

6. (Original) The method of claim 4, wherein the workflow related tables comprise:
a workflow file table, wherein each entry includes one workflow file including code defining a workflow and nodes of the workflow;
a worklist table, wherein each entry includes a worklist associated with a plurality of work items performed at the nodes defined in the associated workflow files; and

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an action list table, wherein each entry includes a list of actions capable of being performed at the nodes defined within one workflow file in the workflow file table.

7. (Original) The method of claim 6, wherein the workflow related tables further comprise:

an action table, wherein each entry includes one action name and an address of a program implementing the action, wherein every action listed in the entries of the action list table are defined in the action table.

8. (Original) The method of claim 4, wherein each set of programming interfaces includes:

a create programming interface to invoke one stored procedure to create an entry of workflow related data in the table associated with the set;

a get programming interface to invoke one stored procedure to retrieve one entry of workflow related data from the table associated with the set;

an update programming interface to invoke one stored procedure to update one entry of workflow related data in the table associated with the set;

a delete programming interface to invoke one stored procedure to delete one entry of workflow related data in the table associated with the set; and

a list programming interface to invoke one stored procedure to list a description of all entries of workflow related data in the table associated with the set.

9. (Original) The method of claim 1, further comprising:

receiving workflow related data from a workflow builder program, wherein the workflow builder program calls the programming interfaces to invoke the associated stored procedure calls and the stored procedures to perform the programming interface operations on the at least one table of workflow related data.

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10. (Original) The method of claim 9, wherein one table comprises a workflow file table, wherein each entry of the workflow file table includes a workflow file including code defining an entire workflow, including nodes and workflow parameters, wherein the workflow files in the workflow file tables are generated by the builder program.

11. (Original) The method of claim 10, further comprising:
executing one stored procedure to retrieve one workflow file in response to receiving a stored procedure call invoked by a programming interface from the buildtime program to retrieve one workflow file, wherein the build time program exports the retrieved workflow file to a workflow engine.

12. (Original) The method of claim 10, wherein the workflow files are implemented in the FlowMark Definition Language (FDL).

13. (Original) A method for maintaining information in a database, comprising:
(a) receiving column definitions for multiple columns in at least one table; and
(b) for each table for which column definitions are received, performing:
(i) generating a table in the database including one column for each column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and
(ii) generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions.

14. (Original) The method of claim 13, wherein each provided programming interface comprises an object oriented programming interface.

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15. (Original) The method of claim 14, wherein the provided programming interfaces are members of an object oriented class, wherein one class is provided for each generated table, and wherein the programming interfaces for one class are capable of invoking stored procedures to perform database operations on the table for which the class of programming interfaces are provided

16. (Original) The method of claim 13, further comprising:

providing one programming interface for each generated stored procedure; wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database.

17. (Currently amended) ~~The method of claim 16, A method for maintaining information in a database, comprising:~~

(a) receiving column definitions for multiple columns in at least one table; and

(b) for each table for which column definitions are received, performing:

(i) generating a table in the database including one column for each column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and

(ii) generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions;

(c) providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, wherein a set of programming interfaces is provided for each table, wherein each set of programming interfaces includes:

(i) a create programming interface to invoke one stored procedure to create an entry in the table associated with the set;

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(ii) a get programming interface to invoke one stored procedure to retrieve data from the table associated with the set;

(iii) an update programming interface to invoke one stored procedure to update one entry in the table associated with the set;

(iv) a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set; and

(v) a list programming interface to invoke one stored procedure to list a description of all entries in the table associated with the set.

18. (Original) The method of claim 13, wherein the information maintained in the at least one database table comprises workflow related information.

19. (Original) The method of claim 13, wherein each column definition indicates a data type and data length of the column.

20. (Previously presented) A system for maintaining workflow related information, comprising:

a storage device;

a database in the storage device including at least one table storing workflow related data;

a computer readable medium including a plurality of programming interfaces, wherein each programming interface specifies an operation to perform on the workflow related data in the at least one table, wherein each programming interface is associated with one stored procedure call in the computer readable medium;

means for providing one stored procedure in the database for each stored procedure call and corresponding programming interface, wherein the one stored procedure includes a plurality of database statements to perform the programming interface operation; and

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means for executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

21. (Original) The system of claim 20, wherein one provided table comprises a workflow file table including entries of workflow files, wherein each workflow file includes code defining an entire workflow, including nodes and workflow parameters.

22. (Original) The system of claim 22, further comprising:
one table in the database including information on actions associated with one workflow file in the workflow file table, wherein the associated actions are capable of being performed at the nodes defined in the associated workflow file.

23. (Currently amended) ~~The system of claim 20; A system for maintaining workflow related information, comprising:~~

a storage device;
a database in the storage device including wherein there are a plurality of tables including workflow related data in the database; and wherein the means for providing the plurality of programming interfaces and associated stored procedure calls and stored procedures further perform

a computer readable medium including providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface specifies an operation to perform on the workflow related data in the at least one table, wherein each programming interface is associated with one stored procedure call in the computer readable medium; and

means for providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement the programming interface operations in the set,

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wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

means for executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

24. (Original) The system of claim 23, wherein the programming interfaces for each table are members of a table class, wherein there is one table class for each table including workflow related data.

25. (Original) The system of claim 23, wherein the workflow related tables in the database comprise:

a workflow file table, wherein each entry includes one workflow file including code defining a workflow and nodes of the workflow;

a worklist table, wherein each entry includes a worklist associated with a plurality of work items performed at the nodes defined in the associated workflow files; and

an action list table, wherein each entry includes a list of actions capable of being performed at the nodes defined within one workflow file in the workflow file table.

26. (Original) The system of claim 25, wherein the workflow related tables in the database further comprise:

an action table, wherein each entry includes one action name and an address of a program implementing the action, wherein every action listed in the entries of the action list table are defined in the action table.

27. (Original) The system of claim 23, wherein each set of programming interfaces in the computer readable medium includes:

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a create programming interface to invoke one stored procedure to create an entry of workflow related data in the table associated with the set;

a get programming interface to invoke one stored procedure to retrieve one entry of workflow related data from the table associated with the set;

an update programming interface to invoke one stored procedure to update one entry of workflow related data in the table associated with the set;

a delete programming interface to invoke one stored procedure to delete one entry of workflow related data in the table associated with the set; and

a list programming interface to invoke one stored procedure to list a description of all entries of workflow related data in the table associated with the set.

28. (Original) The system of claim 20, further comprising:

means for receiving workflow related data from a workflow builder program, wherein the workflow builder program calls the programming interfaces to invoke the associated stored procedure calls and the stored procedures to perform the programming interface operations on the at least one table of workflow related data.

29. (Original) The system of claim 28, wherein one table in the database comprises a workflow file table, wherein each entry of the workflow file table includes a workflow file including code defining an entire workflow, including nodes and workflow parameters, wherein the workflow files in the workflow file tables are generated by the builder program.

30. (Original). The system of claim 29, further comprising:

means for executing one stored procedure to retrieve one workflow file in response to receiving a stored procedure call invoked by a programming interface from the buildtime program to retrieve one workflow file, wherein the build time program exports the retrieved workflow file to a workflow engine.

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31. (Original) The system of claim 29, wherein the workflow files are implemented in the FlowMark Definition Language (FDL).

32. (Original) A system for maintaining information in a database, comprising:

- (a) means for receiving column definitions for multiple columns in at least one table;
- (b) means for generating a table in the database including one column for each received column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and
- (c) means for generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions.

33. (Original) The system of claim 32, wherein each programming interface comprises an object oriented programming interface.

34. (Original) The system of claim 33, wherein the programming interfaces are members of an object oriented class, wherein one class is provided for each generated table, and wherein the programming interfaces for one class are capable of invoking stored procedures to perform database operations on the table for which the class of programming interfaces are provided.

35. (Original) The system of claim 32, further comprising:
a computer readable medium including one programming interface for each generated stored procedure, wherein each programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database.

36. (Currently amended) ~~The system of claim 35~~ A system for maintaining information in a database, comprising:

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- (a) means for receiving column definitions for multiple columns in at least one table;
- (b) means for generating a table in the database including one column for each received column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and
- (c) means for generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions; and
- (d) a computer readable medium including one programming interface for each generated stored procedure, wherein each programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, wherein the computer readable medium includes a set of programming interfaces for each table, wherein each set of programming interfaces in the computer readable medium includes:
 - (i) a create programming interface to invoke one stored procedure to create an entry in the table associated with the set;
 - (ii) a get programming interface to invoke one stored procedure to retrieve data from the table associated with the set;
 - (iii) an update programming interface to invoke one stored procedure to update one entry in the table associated with the set;
 - (iv) a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set; and
 - (v) a list programming interface to invoke one stored procedure to list a description of all entries in the table associated with the set.

37. (Original) The system of claim 32, wherein the information maintained in the at least one database table comprises workflow related information.

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38. (Original) The system of claim 32, wherein each column definition indicates a data type and data length of the column.

39. (Previously presented) An article of manufacture including code for maintaining workflow related information by:

providing at least one table in a database storing workflow related data;
providing a plurality of programming interfaces, wherein each programming interface specifies an operation to perform on the workflow related data in the at least one table, wherein each programming interface is associated with one stored procedure call;
providing in the database one stored procedure for each stored procedure call and corresponding programming interface, wherein the one stored procedure includes a plurality of database statements to perform the programming interface operation; and
executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

40. (Original) The article of manufacture of claim 39, wherein one provided table comprises a workflow file table including entries of workflow files, wherein each workflow file includes code defining an entire workflow, including nodes and workflow parameters.

41. (Original) The article of manufacture of claim 40, further comprising one table including information on actions associated with one workflow file in the workflow file table, wherein the associated actions are capable of being performed at the nodes defined in the associated workflow file.

42. (Currently amended) ~~The article of manufacture of claim 39, wherein there are~~
An article of manufacture including code for maintaining workflow related information by:

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providing a plurality of tables including workflow related data; and wherein providing the plurality of programming interfaces and associated stored procedure calls and stored procedures further comprises:

providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface is associated with one stored procedure call; and

providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement the programming interface operations in the set, wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in one table.

43. (Original) The article of manufacture of claim 42, wherein the programming interfaces for each table are members of a table class, wherein there is one table class for each table including workflow related data.

44. (Original) The article of manufacture of claim 42, wherein the workflow related tables comprise:

a workflow file table, wherein each entry includes one workflow file including code defining a workflow and nodes of the workflow;

a worklist table, wherein each entry includes a worklist associated with a plurality of work items performed at the nodes defined in the associated workflow files; and

an action list table, wherein each entry includes a list of actions capable of being performed at the nodes defined within one workflow file in the workflow file table.

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45. (Original) The article of manufacture of claim 44, wherein the workflow related tables further comprise:

an action table, wherein each entry includes one action name and an address of a program implementing the action, wherein every action listed in the entries of the action list table are defined in the action table.

46. (Original) The article of manufacture of claim 42, wherein each set of programming interfaces includes:

a create programming interface to invoke one stored procedure to create an entry of workflow related data in the table associated with the set;

a get programming interface to invoke one stored procedure to retrieve one entry of workflow related data from the table associated with the set;

an update programming interface to invoke one stored procedure to update one entry of workflow related data in the table associated with the set;

a delete programming interface to invoke one stored procedure to delete one entry of workflow related data in the table associated with the set; and

a list programming interface to invoke one stored procedure to list a description of all entries of workflow related data in the table associated with the set.

47. (Original) The article of manufacture of claim 39, further comprising:

receiving workflow related data from a workflow builder program, wherein the workflow builder program calls the programming interfaces to invoke the associated stored procedure calls and the stored procedures to perform the programming interface operations on the at least one table of workflow related data.

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48. (Original) The article of manufacture of claim 47, wherein one table comprises a workflow file table, wherein each entry of the workflow file table includes a workflow file including code defining an entire workflow, including nodes and workflow parameters, wherein the workflow files in the workflow file tables are generated by the builder program.

49. (Original) The article of manufacture of claim 48, further comprising; executing one stored procedure to retrieve one workflow file in response to receiving a stored procedure call invoked by a programming interface from the buildtime program to retrieve one workflow file, wherein the build time program exports the retrieved workflow file to a workflow engine.

50. (Original) The article of manufacture of claim 48, wherein the workflow files are implemented in the FlowMark Definition Language (FDL).

51. (Original) An article of manufacture including code for maintaining information in a database by:

- (a) receiving column definitions for multiple columns in at least one table;
- (b) for each table for which column definitions are received, performing:
 - (i) generating a table in the database including one column for each column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and
 - (ii) generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions.

52. (Original) The article of manufacture of claim 51, wherein each provided programming interface comprises an object oriented programming interface.

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53. (Original) The article of manufacture of claim 52, wherein the provided programming interfaces are members of an object oriented class, wherein one class is provided for each generated table, and wherein the programming interfaces for one class are capable of invoking stored procedures to perform database operations on the table for which the class of programming interfaces are provided

54. (Original) The article of manufacture of claim 51, further comprising:
providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database.

55. (Currently amended) The article of manufacture of claim 54 An article of manufacture including code for maintaining information in a database by:
(a) receiving column definitions for multiple columns in at least one table;
(b) for each table for which column definitions are received, performing:
 (i) generating a table in the database including one column for each column definition, wherein each column is generated with attributes specified by the column definition for which the column is generated; and
 (ii) generating at least one stored procedure including database statements in the database to perform an operation on the data in the generated table, wherein the stored procedure is capable of accessing the columns generated according to the column definitions
(c) providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, wherein a set of programming interfaces is provided for each table, wherein each set of programming interfaces includes:
 (i) a create programming interface to invoke one stored procedure to create an entry in the table associated with the set;

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- (ii) a get programming interface to invoke one stored procedure to retrieve data from the table associated with the set;
- (iii) an update programming interface to invoke one stored procedure to update one entry in the table associated with the set;
- (iv) a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set; and
- (v) a list programming interface to invoke one stored procedure to list a description of all entries in the table associated with the set.

56. (Original) The article of manufacture of claim 51, wherein the information maintained in the at least one database table comprises workflow related information.

57. (Original) The article of manufacture of claim 51, wherein each column definition indicates a data type and data length of the column.

58. (New) The method of claim 1, wherein an automatic generation utility is capable of receiving one template for the at least one table corresponding to the one stored procedure and based on the received template is capable of performing:

- (i) generating the at least one table in the database storing workflow related data; and
- (ii) generating the one stored procedure for each stored procedure call and corresponding method.

59. (New) The method of claim 58, wherein the one template includes column definition for the at least one table, and wherein the one template is provided via an input from an user.

60. (New) The method of claim 1, wherein there are plurality of tables including workflow related data, wherein a set of programming interfaces are provided for each table

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including workflow related data, and wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided.

61. (New) The method of claim 13 further comprising:

providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, and wherein a set of programming interfaces is provided for each table, wherein each set of programming interfaces includes:

a create programming interface to invoke one stored procedure to create an entry in the table associated with the set; and

a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set.

62. (New) The method of claim 13, further comprising:

providing a plurality of tables including workflow related data;

providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface is associated with one stored procedure call; and

providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement programming interface operations in the set, wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in the at least one table.

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63. (New) The method of claim 13, wherin an automatic generation utility is capable of receiving one template for the at least one table, wherein the one template is provided via an input from an user, and wherein the automatic generation utility generates the table and the at least one stored procedure.

64. (New) The system of claim 20, further comprising:
an automatic generation utility that is capable of receiving one template for the at least one table corresponding to the one stored procedure and based on the received template is capable of performing:

- (i) generating the at least one table in the database storing workflow related data; and
- (ii) generating the one stored procedure for each stored procedure call and corresponding method.

65. (New) The system of claim 64, wherein the one template includes column definition for the at least one table, and wherein the one template is provided via an input from an user.

66. (New) The system of claim 20, wherein there are plurality of tables including workflow related data, wherein a set of programming interfaces are provided for each table including workflow related data, and wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided.

67. (New) The system of claim 32, further comprising:
means for providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, and wherein a set of programming interfaces is provided for each table, wherein each set of programming interfaces includes:

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a create programming interface to invoke one stored procedure to create an entry in the table associated with the set; and

a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set.

68. (New) The system of claim 32, further comprising:

means for providing a plurality of tables including workflow related data;

means for providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface is associated with one stored procedure call; and

means for providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement programming interface operations in the set, wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

means for executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in the at least one table.

69. (New) The system of claim 32, further comprising:

an automatic generation utility that is capable of receiving one template for the at least one table, wherein the one template is provided via an input from an user, and wherein the automatic generation utility generates the table and the at least one stored procedure.

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70. (New) The article of manufacture of claim 39, wherein an automatic generation utility is capable of receiving one template for the at least one table corresponding to the one stored procedure and based on the received template is capable of performing:

- (i) generating the at least one table in the database storing workflow related data; and
- (ii) generating the one stored procedure for each stored procedure call and corresponding method.

71. (New) The article of manufacture of claim 70, wherein the one template includes column definition for the at least one table, and wherein the one template is provided via an input from an user.

72. (New) The article of manufacture of claim 39, wherein there are plurality of tables including workflow related data, wherein a set of programming interfaces are provided for each table including workflow related data, and wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided.

73. (New) The article of manufacture of claim 51, wherein the article of manufacture is further capable of:

providing one programming interface for each generated stored procedure, wherein each provided programming interface is called to invoke one stored procedure call to further invoke and execute one stored procedure in the database, and wherein a set of programming interfaces is provided for each table, wherein each set of programming interfaces includes:

- a create programming interface to invoke one stored procedure to create an entry in the table associated with the set; and
- a delete programming interface to invoke one stored procedure to delete one entry in the table associated with the set.

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74. (New) The article of manufacture of claim 51, wherein the article of manufacture is further capable of:

providing a plurality of tables including workflow related data;

providing a set of programming interfaces for each table including workflow related data, wherein each set of programming interfaces defines a same set of operations to perform on the table for which the set is provided, wherein each programming interface is associated with one stored procedure call; and

providing stored procedure calls and stored procedures in the database for each set of programming interfaces to implement programming interface operations in the set, wherein one stored procedure is provided for each stored procedure call and corresponding method, and wherein the one stored procedure includes a plurality of database statements to perform a programming interface operation; and

executing the one stored procedure in the database to perform the corresponding programming interface operation on workflow related data in the at least one table.

75. (New) The article of manufacture of claim 51, wherein an automatic generation utility is capable of receiving one template for the at least one table, wherein the one template is provided via an input from an user, and wherein the automatic generation utility generates the table and the at least one stored procedure.